WELKER

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WELKER® TRANSPORTABLE CRUDE OIL CONTAINER

MODEL
TCC-5

DRAWING NUMBERS
AD557C0.1
AD557C0.2

MANUAL NUMBER
IOM-197

REVISION
Rev. A, 05/01/2024

TABLE OF CONTENTS

SAFETY

IMPORTANT SAFETY INFORMATION
READ ALL INSTRUCTIONS

NOTES emphasize information and/or provide additional information to assist the user.

CAUTION messages appear before procedures that could result in damage to equipment if not observed.

WARNING messages appear before procedures that could result in personal injury if not observed.

This manual is intended to be used as a basic installation and operation guide for the Welker® Transportable Crude Oil Container, TCC-5. For comprehensive instructions, please refer to the Installation, Operation, and Maintenance (IOM) *Manuals for each individual component. A list of relevant component IOM Manuals is provided in the Appendix to this manual.*

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operation, and maintenance of the Welker® equipment described in this manual. Correct installation and operation, however, are the responsibility of the end user. Welker® reserves the right to make changes to this manual and all products in order to improve performance and reliability.

BEFORE YOU BEGIN

Read these instructions completely and carefully.

IMPORTANT – Save these instructions for local inspector's use.

IMPORTANT – Observe all governing codes and ordinances.

Note to Installer – Leave these instructions with the end user.

Note to End User – Keep these instructions for future reference.

Installation of this Transportable Crude Oil Container is of a mechanical nature.

Proper installation is the responsibility of the installer. Product failure due to improper installation is not covered under the warranty.

If you received a damaged Transportable Crude Oil Container, please contact a Welker® representative immediately.

Phone: 281.491.2331
Address: 13839 West Bellfort Street
Sugar Land, TX 77498

SECTION 1: PRODUCT INFORMATION

1.1 Introduction

We appreciate your business and your choice of Welker® products. The installation, operation, and maintenance liability for this equipment becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance* (IOM) *Manuals* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use.*

If you have any questions, please call Welker® at 1.281.491.2331.

**The following procedures have been written for use with standard Welker® parts and equipment. Assemblies that have been modified might have additional requirements and specifications that are not listed in this manual.*

1.2 Product Description

The Welker® *TCC-5* Transportable Crude Oil Container is an atmospheric sample container designed for ease of use and sample accuracy when collecting and transporting stabilized liquid product.

Product level can be visually verified onsite by referring to the liquid level gauge on the top of the TCC-5. Optional equipment—such as the following—can be added to enable remote operation: a high-level switch to signal the Programmable Logic Controller (PLC) once the desired volume of sample has been collected and a magnetostrictive level indicator to communicate product level to the PLC.

The TCC-5's quick-connects allow the TCC-5 to be quickly installed to and disconnected from a sampling system or mixing skid equipped with flexible hoses with quick-connects. The TCC-5 can be installed to a laboratory mixing skid to mix the collected sample for laboratory analysis and to clean the TCC-5 after use. The internal spray bar with nozzle ensures that the walls and top of the TCC-5 are reached during mixing and cleaning.

For this manual, the term "PLC" or Programmable Logic Controller, will be used to refer to the PLS, DCS, or other signal control system used by the customer to activate and operate the solenoid.

Welker® might custom design the TCC-5 to suit the particular application and specifications of each customer.

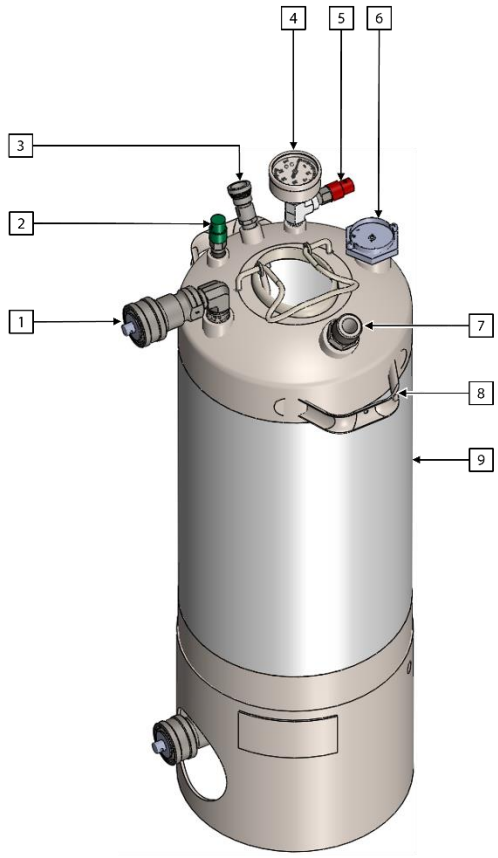
1.3 Specifications

The specifications listed in this section are generalized for this equipment. Welker® can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customization of your equipment.**

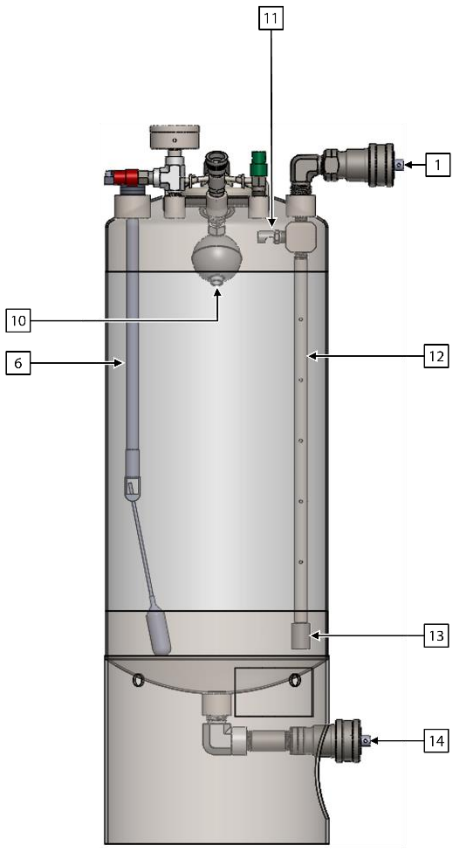
Table 1: Welker® TCC-5 Specifications	
Applications	Collection of Product That Is Stable or Stratifies at Atmospheric Conditions Transport of Samples to Laboratory for Mixing and Analysis
Materials of Construction	316/316L Stainless Steel With Stainless Steel Fittings
Maximum Allowable Inlet Pressure	136 psig @ -20 °F to 100 °F (*9 barg @ -28 °C to 37 °C*)
Volume	5 US Gallons (*18.9 Liters*) at 100% Full
Approximate Weight	30 lb (Dry – Does Not Include Optional Items) Others Available
Approximate Dimensions	14" x 12½" x 30" (Length x Width x Height) (Not Including Optional Items) Others Available
Features	Compatible With Welker® MSTCC Laboratory Mixing Skids Portable [Two (2) Handles] Precision Spray Bar With Nozzle Pressure Gauge Pressure Relief Valve Quick-Connects Rounded Bottom Vacuum Breaker (i.e., Vacuum Relief Valve) Visual Liquid Level Gauge
Industry Standards / Product Certifications	Follows API 8.2 Standard Practice for Automatic Sampling of Petroleum and Petroleum Products (ASTM Practice D4177 – 22) ASME Code Stamped (Stainless Steel Container)
Options	Compression Sleeve High-Level Switch Magnetostrictive Level Indicator Lid Style

1.4 Equipment Diagrams

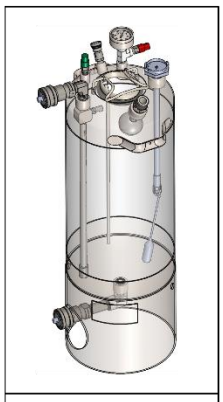
Figure 1: Welker® TCC-5 Transportable Crude Oil Container Diagram



FRONT VIEW, ANGLED



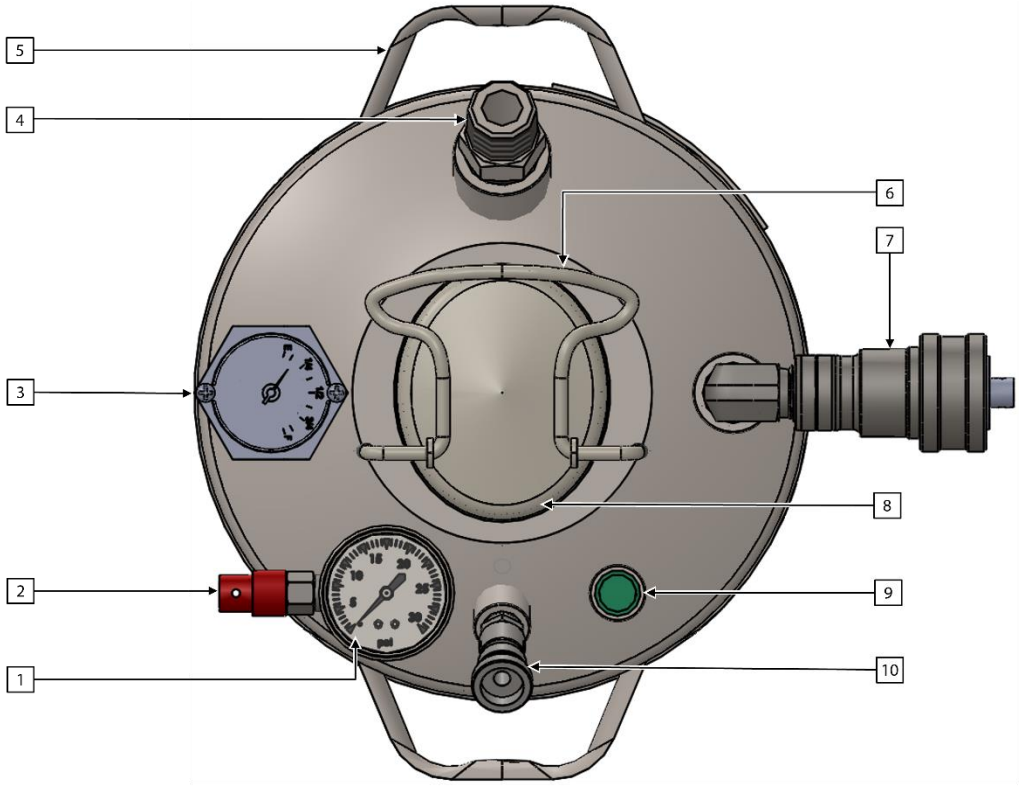
SIDE VIEW, SHOWING INTERIOR

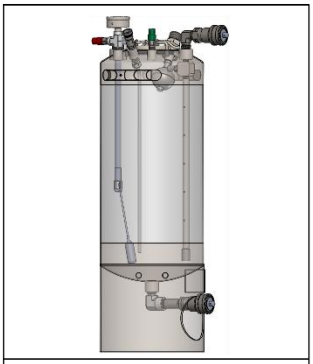


TCC-5 – Transparent to Show Interior

No.	Description
1	Return Quick-Connect
2	Vacuum Relief Valve (Green Cap)
3	Sample Inlet
4	Pressure Gauge
5	Pressure Relief Valve (Red Cap)
6	Level Gauge
7	High-Level Switch Adapter – Plugged When Not Used
8	Handle (Qty = 2)
9	5-Gallon TCC Tank
10	High-Level Switch
11	Spray Nozzle
12	Crude Oil Mixer
13	Crude Oil Mixer Cap
14	Sample Outlet Quick-Connect

Figure 2: Welker® TCC-5 Standard Lid Design

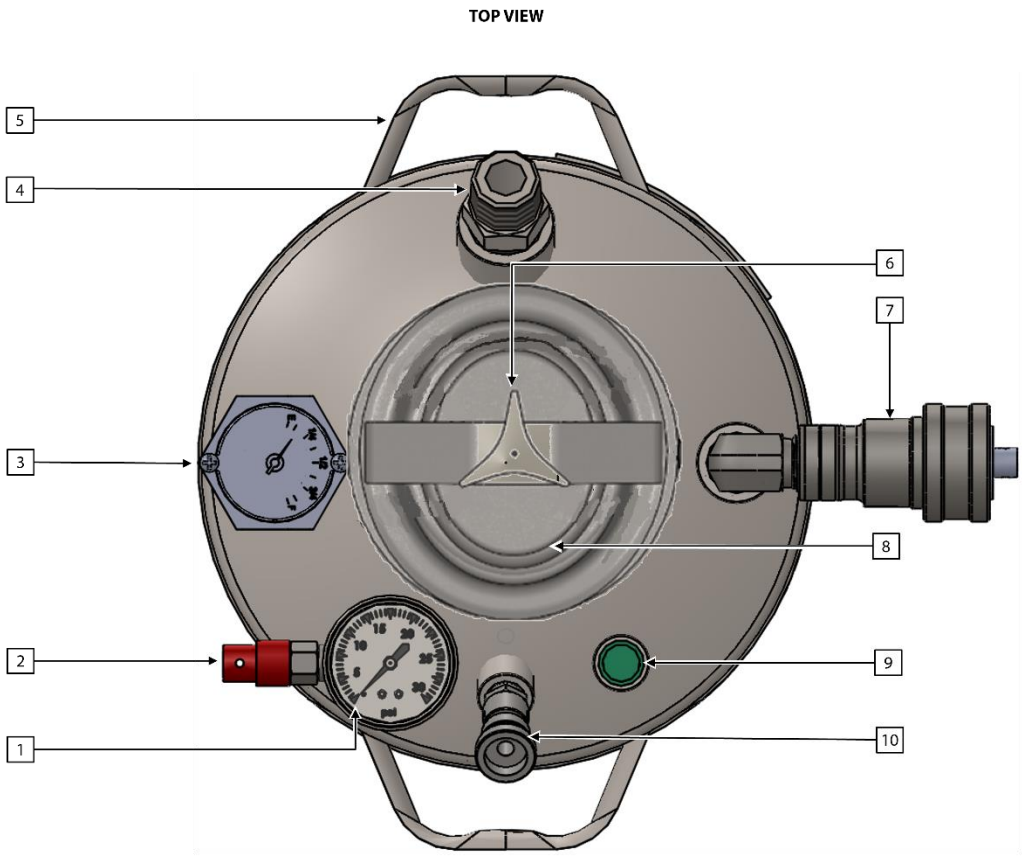




TCC-5, Angled, Transparent for Clarity

No.	Description
1	Pressure Gauge ¼" FNPT Port
2	Pressure Relief Valve ¼" FNPT Port (Red Cap)
3	Level Gauge ¾" FNPT Port
4	High-Level Switch ¾" FNPT Port
5	Handle (Qty = 2)
6	Flip-Lever Lid Handle
7	Return Quick-Connect ½" FNPT Port
8	Oval Lid
9	Vacuum Relief Valve ¼" FNPT Port (Green Cap)
10	Sample Inlet ¼" FNPT Port (Quick-Connect)

Figure 3: Welker® TCC-5 Screw-Tight Lid Diagram



TCC-5 Screw-Tight Lid, Side View

No.	Description
1	Pressure Gauge ¼" FNPT Port
2	Pressure Relief Valve ¼" FNPT Port (Red Cap)
3	Level Gauge ¾" FNPT Port
4	High-Level Switch ¾" FNPT Port
5	Handle (Qty = 2)
6	Adjustment Knob
7	Return Quick-Connect ½" FNPT Port
8	Oval Lid
9	Vacuum Relief Valve ¼" FNPT Port (Green Cap)
10	Sample Inlet ¼" FNPT Port (Quick-Connect)

SECTION 2: INSTALLATION & OPERATION

2.1 Before You Begin

After unpacking the unit, check the equipment for compliance and any damage that might have occurred during shipment. Immediately contact a Welker® representative if you received damaged equipment.

When sealing fittings with PTFE tape, refer to the proper sealing instructions for the brand used.

These instructions are written with the assumption that a Welker® MSTCC Laboratory Mixing Skid will be used to mix the contents of the TCC-5. While it is possible to use the MSTCC and the TCC-5 with equivalent third-party equipment, the MSTCC has been designed to take full advantage of the TCC-5's features to provide a quality sample for basic sediment and water (BS&W) monitoring.

Ensure that the TCC-5 is clean and free of contaminants that might affect the sample. See *Section 3.2, Cleaning the TCC-5 Without Using an MSTCC* or refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the Welker® MSTCC Laboratory Mixing Skid (listed in the *Appendix* to this manual) for instructions on properly cleaning the TCC-5.

2.2 Installing the TCC-5 to the Sampling System

All fittings have been aligned for optimal performance and user convenience. Do not change the fitting alignment.

1. Remove the sample inlet cover from the sample inlet port on the TCC-5 (*Figure 1* or *Figure 2* or *Figure 3*).
2. Using ¼" flexline with a maximum allowable operating pressure (MAOP) greater than or equal to 136 psig (*9 barg*), connect from the sampler outlet port to the sample inlet port on the TCC-5. The sampler should be positioned above or level with the product inlet on the TCC-5.

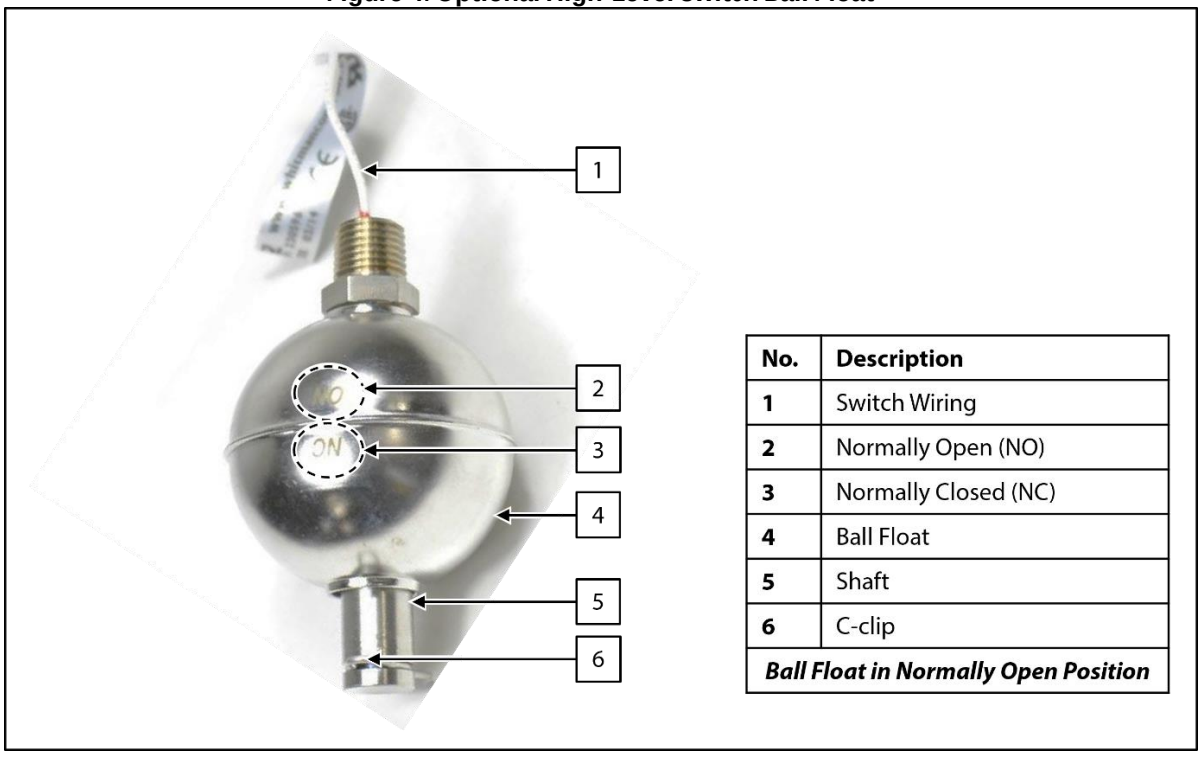
Customer-supplied tubing must slope downward from the sampler to the TCC-5 to ensure that all of the product sampled (BS&W) flows to the TCC-5.

3. **If the TCC-5 is equipped with the optional magnetostrictive level transmitter,** refer to the appropriate *Installation, Operation, and Maintenance* (IOM) *Manual* (*Welker® IOM-V308*) for instructions.
4. **If the TCC-5 is equipped with the optional high-level switch,** connect the high-level switch to an alarm signal, safety device, or PLC in accordance with system requirements (*Figure 1* or *Figure 2* or *Figure 3).*
5. The optional high-level switch comes factory-set to the normally open (NO) position. If desired, the optional high-level switch may be set to the normally closed (NC) position. To set the optional high-level switch to be normally closed, continue to step 6.

Reversing the Optional High-Level Switch

6. Follow the instructions in *Section 2.3, Opening the Lid of the TCC-5*, to open the lid of the TCC-5. Then locate the ball float.
7. Remove the C-clip from the shaft (*Figure 4*). Then remove the ball float from the shaft.
8. Reverse the orientation of the ball float so that the normally closed (NC) indicator is on top (*Figure 4*).
9. Return the C-clip to the shaft to secure the ball float to the shaft.

Figure 4: Optional High-Level Switch Ball Float



No.	Description
1	Switch Wiring
2	Normally Open (NO)
3	Normally Closed (NC)
4	Ball Float
5	Shaft
6	C-clip

Ball Float in Normally Open Position

2.3 Opening the Lid of the TCC-5

If excessive force is used to open the lid of the TCC-5, the lid could pop and cause severe personal injury.

Always, the first step in opening the lid of the TCC-5 is to depressurize the TCC unit by depressing the inlet quick-connect body (*Figure 1*). Forcing the lid open without depressurization could cause severe personal injury.

1. Depressurize the TCC-5 by depressing the inlet quick-connect body (*Figure 1*).
2. **If the TCC-5 is equipped with the standard (i.e., flip-lever) lid** (*Figure 2*), pull up on the flip lever. This will release the lid. Then, while grasping the flip lever, carefully maneuver the oval lid, tilt the lid slightly sideways in the oval opening, and pull the lid off. Place the lid in a dry location that has been inspected for cleanliness.
3. **If the TCC-5 is equipped with the optional screw-tight lid** (*Figure 3*), carefully turn the adjustment knob just enough to release the lid. Then carefully maneuver the oval lid, tilt the lid slightly sideways in the oval opening, and pull the lid off. Place the lid in a dry location that has been inspected for cleanliness.

2.4 Closing the Lid of the TCC-5

If the lid of the TCC-5 is not properly closed before operation, the sample might be compromised. An improperly closed lid might allow water to enter or vapors to escape, thus changing the composition of the sample.

If the TCC-5 is equipped with the standard (i.e., flip-lever) lid, continue to instructions under the **Standard Lid** heading.
If the TCC-5 is equipped with the screw-tight lid, proceed to instructions under the **Screw-Tight Lid** heading.

For liquid products, **never** fill the container above 80% of its capacity. Allow at least 20% for product expansion should the container be exposed to increased temperatures.

Note that there are 3,785 cc in 1 US gallon. The volume of each TCC-5 is 5 gallons (18.92 liters) at 100%.

Standard Lid

1. Lightly lubricate the O-ring that is on the lid. The O-ring might become brittle and crack if not covered with a thin layer of lubricant prior to use. Lubrication also helps ensure the seal seats properly and does not twist.

Welker® recommends a silicone-based lubricant, such as Molykote® 111, for use with this unit.

2. Gripping the lid holder (i.e., flip lever), orient the lid inside the opening of the TCC-5, gently moving it until the oval lid is in line with the oval opening.
3. Gently pull up on the lid holder (i.e., flip lever) (*Figure 2*), then press the flip lever gently into place. The flip lever should fit snugly closed with a small amount of pressure. If you meet resistance requiring more than gentle pressure, check the alignment of the lid before proceeding, because the alignment might need to be corrected.

Do not pull up on the lid holder with excessive force or try to force the lid holder into place. Doing so might bend the lid or the lid opening. This will permanently ruin lid alignment, and the tank will leak until serviced or replaced.

Screw-Tight Lid (Optional)

1. Lightly lubricate the O-ring that is on the lid. The O-ring could become brittle and crack if not covered with a thin layer of lubricant prior to use. Lubrication also helps ensure the seal seats properly and does not twist.

Welker® recommends a silicone-based lubricant, such as Molykote® 111, for use with this unit.

2. Grasping the lid holder, situate the lid inside the opening of the TCC-5.
3. Gently pull up on the lid while hand-tightening the adjustment knob (*Figure 3*). Stop tightening the adjustment knob once resistance is met.

2.5 Mixing Operations

1. Ensure that the lid of the TCC-5 is properly closed. See *Section 2.4, Closing the Lid of the TCC-5* for instructions on properly closing the lid of the TCC-5.

STOP

If the lid of the TCC-5 is not properly closed before operation, the sample might be compromised. An improperly closed lid might allow water to enter or vapors to escape, thus changing the composition of the sample.

2. Install the TCC-5 to a Welker® MSTCC Laboratory Mixing Skid. Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the MSTCC for instructions on installing the TCC-5 to the skid.
3. To retrieve a homogeneous sample from the TCC -5, refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the MSTCC for correct operating procedures.
4. Allow the contents of the TCC-5 to mix in accordance with company policy.

STOP

Never remove the lid during mixing operations, because this will cause sample to spray out of the TCC-5.

5. Once the contents of the TCC-5 have been thoroughly mixed, extract the appropriate amount of sample. Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the MSTCC for instructions.

Consult company policy for the volume of sample required for testing.

6. After extracting the required amount of sample, the TCC-5 can be cleaned using the MSTCC. Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the MSTCC for instructions on cleaning the TCC-5 while the skid is still in operation. To clean the TCC-5 without using the MSTCC, see *Section 3.2, Cleaning the TCC-5 Without Using an MSTCC*.

STOP

The unit might be heavy when it reaches the 80% limit. It might be necessary to have a partner assist in removing the TCC-5. Use appropriate personal protective equipment (PPE) and follow appropriate company policies for heavy lifting.

SECTION 3: MAINTENANCE

3.1 Before You Begin

1. **Welker® recommends that the TCC-5 be cleaned after each use**. If the TCC-5 is stored for some time prior to use, the TCC-5 might need to be cleaned prior to being installed to a sampling system.
2. Prior to maintenance or disassembly of the unit, it is advisable to have an appropriate seal available to replace the lid seal in case of normal or unexpected lid seal wear. Be sure to lightly lubricate the O-ring on the lid. The O-ring might become brittle and crack if not covered with a thin layer of lubricant prior to use. Lubrication also helps ensure the seal seats properly and does not twist.

New seals supplied in spare parts kits should be lightly lubricated before being installed to ease the installation of the seals and reduce the risk of damage when positioning them on parts. Wipe excess lubricant from the seals, as it might adversely affect analytical instrument results. Be sure to lightly lubricate the O-ring for the lid. The O-ring might become brittle and crack if not covered with a thin layer of lubricant prior to use.

Welker® recommends a silicone-based lubricant, such as Molykote® 111, for use with this unit.

3. All maintenance and cleaning of the unit should be performed on a smooth, clean surface.
4. Welker® recommends having the following tools available for maintenance. Please note that the exact tools required might vary by model.
    - Clean Rags
    - Cleaning Solvent
    - Lubricant
    - Seal Pick

3.2 Cleaning the TCC-5 Without Using an MSTCC

The TCC-5 can be drained and cleaned while still connected to the Welker® MSTCC Laboratory Mixing Skid. Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the MSTCC for instructions.

STOP

The TCC-5 **must be depressurized** before opening the lid of the TCC-5. Removing the lid of the TCC-5 under pressure could cause severe injury.

1. Relieve pressure within the TCC-5 by depressing the inlet quick-connect body (*Figure 1*).
2. Open the lid of the TCC-5 by following the directions in *Section 2.3, Opening the Lid of the TCC-5*.

If the TCC-5 is equipped with the optional screw-tight lid, the adjustment knob needs to be loosened before the lid of the TCC-5 can be removed.

STOP

The unit might be heavy. It might be necessary to have a partner assist in moving and shaking the TCC-5. Use appropriate personal protective equipment (PPE) and follow appropriate company policies for heavy lifting.

3. Drain the contents of the TCC-5. Follow company policy in safely disposing of the contents of the TCC-5.
4. Flush and wipe down the TCC-5 with a cleaning solvent according to the following steps:
    a. Add approximately one (1) cup of solvent to the TCC-5.
    b. Replace the lid by following the instructions in *Section 2.4, Closing the Lid of the TCC-5*.
    c. The unit might be heavy. It might be necessary to have a partner assist. Use appropriate personal protective equipment (PPE) and follow appropriate company policies for heavy lifting. Shake the TCC-5 thoroughly while the unit is upright.
    d. Invert the TCC-5, then shake the unit thoroughly while the unit is inverted.
    e. Open the lid according to instructions in *Section 2.3, Opening the Lid of the TCC-5,* and drain the solvent, safely disposing of the solvent according to company policy.

Welker® recommends cleaning the TCC with a quick-evaporating solvent. Refer to the appropriate company policy for the approved quick-evaporating solvent. Use chemical solvents safely, following all personal protective equipment (PPE) and usage directions listed on the solvent label and Material Safety Data Sheet (MSDS).

5. Carefully dry the inside of the TCC-5 with a clean, dry cloth.
6. If the cloth becomes dirty or if product is visible on the cloth when drying the TCC -5, repeat steps 4 and 5 until the cloth is clean upon removal.
7. Close the lid of the TCC-5. See *Section 2.4, Closing the Lid of the TCC* -5, for instructions on properly closing the lid of the TCC-5.
8. The cleaned TCC-5 may now be installed to a sampling system. See *Section 2.2, Installing the TCC-5 to the Sampling System*, for instructions. If the TCC will be stored prior to next use, tape, cap, or plug the ports on the TCC-5 to prevent moisture and/or insects from entering.

3.3 Troubleshooting Guidelines

Table 2: Welker® TCC-5 Troubleshooting Guidelines		
Issues	**Possible Causes**	**Solutions**
The standard lid will not close properly.	The lid and opening are not aligned properly because excessive force was used to try to close the lid.	Call Welker® for service options.
The solvent used to clean the TCC-5 is toxic.	Adverse effects could be encountered by the operator should the operator fail to follow company policy and use proper personal protective equipment (PPE).	Use all chemical solvents safely, following all personal protective equipment (PPE) and usage directions listed on the solvent label and Material Safety Data Sheet (MSDS).
The O-ring on the lid has become brittle and cracked.	The O-ring on the lid was not lubricated prior to each use.	Replace the O-ring. Be sure to lightly lubricate the O-ring prior to each use of the TCC-5. Welker® recommends a silicone-based lubricant, such as Molykote® III, for use with this unit.
The sample obtained from the TCC-5 is contaminated.	The TCC-5 lid was improperly closed, allowing water to enter or vapors to escape the sample. The TCC-5 was not cleaned after each use or the TCC-5 was stored for some time prior to use without being cleaned prior to being installed.	Carefully and completely follow the instructions listed in *Section 2.4, Closing the Lid of the TCC-5*. Welker® recommends that the TCC-5 be cleaned after each use. Welker® also recommends cleaning the TCC-5 prior to being installed after the TCC-5 has been stored for some time.
The TCC-5 lid will not open.	The TCC-5 has not been depressurized.	Do not try to force the lid open because severe personal injury could result. Depressurize the TCC-5 unit by depressing the inlet quick-connect body. Carefully and completely follow the instructions listed in *Section 2.3, Opening the Lid of the TCC-5*.

APPENDIX: REFERENCED OR ATTACHED DOCUMENTS

Welker® *Installation, Operation, and Maintenance* (IOM) *Manuals* suggested for reference or for use with this unit:

- IOM-036: Welker® MSTCC Laboratory Mixing Skid
- IOM-136: Welker® MSTCCA Laboratory Mixing Skid
- IOM-205: Welker® MSTCCJ Laboratory Mixing Skid

Other *Installation, Operation, and Maintenance* (IOM) *Manuals* suggested for reference or for use with this unit:

- ABB Inc. K-TEK AT100/AT100S Magnetostrictive Level Transmitter (Welker® IOM-V308)
- Apollo Valves 76-100 Series Stainless Steel Ball Valve with Mounting Pad 1/4" - 1" (Welker® IOM-V141)
- Emerson Electric Co. Appleton® U-Line® Factory Sealed 20 Amp Plugs and Receptacles (Welker® IOM-V074)
- Generant Vent Relief Valve Series VRV (Welker® IOM-V175)
- Lumberg Automation Mini Male Receptacle RSF 30-05/XX (Welker® IOM-V336)
- Madison Company M5600 Stainless Steel Full Size Float Level Switch Sensor (Welker® IOM-V332)
- Parker Hannifin Corporation Snap-tite 71 Series High Pressure, Push-to-Connect Non-Spill Quick Couplings (Welker® IOM-V333)
- PIC Gauges 302DNF All Stainless Center Back Mount Gauges (Welker® IOM-V335)
- Rochester Gauges, Inc. Magnetic Liquid-Level Gauges for 7300 Series (Welker® IOM-V334)
- Rochester Gauges, Inc. Magnetic Liquid-Level Gauges 8600 Series (Welker® IOM-V329)
- Swagelok® Check Valves C, CA, CH, CP, and CPA Series (Welker® IOM-V076)
- Swagelok® One-Piece Instrumentation Ball Valves 40G Series and 40 Series (Welker® IOM-V085)
- Swagelok® Quick-Connects QC, QF, QM, and QTM Series (Welker® IOM-V088)
- TURCK Inc. Proximity Switch BC 5-S18-Y1X-0.2M-RS 4.21T (Welker® IOM-V331)
- Whitman Controls Corporation Vertical Mount Level Switch L60/L65 Series (Welker® IOM-V328)
- WIKA Bourdon Tube Pressure Gauges Type 232.53 and Type 233.53 (Welker® IOM-V171)

Welker® drawings and schematics suggested for reference or for use with this unit:

- Assembly Drawing: AD557CO.1 (Welker® TCC-5 Transportable Crude Oil Container With Standard Lid)
- Assembly Drawing: AD557CO.2 (Welker® TCC-5 Transportable Crude Oil Container)

NOTES

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